REMARKS

I. Status of the Application

Claims 1-21 are pending in this application. In the June 17, 2002 Office Action, the Examiner:

1. Rejected claims 1-5 and 7-11 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 4,515,429 to Smith et al (hereinafter "Smith");

2. Objected to claims 6 and 12 as being dependent upon a rejected base claim; and

3. Allowed claims 13-21.

Applicants respectfully traverse the rejections of the claims and respectfully request reconsideration of the pending claims in view of the following remarks.

II. The Prior Art Rejections Should be Withdrawn

A. Claim 1

1. The Present Invention

Claim 1 is directed to a method of controlling the transmission of a light signal, including transmitting the light signal through a first fiber optic line. The light signal is received with a light receiving unit operatively coupled to the first fiber optic line. The light receiving unit is operative to refract the light signal so that the light signal is substantially prevented from being transmitted through the light receiving unit if an

intensity level of the light signal has a predetermined relationship with an intensity threshold level.

2. Smith

Smith is directed to an optical device wherein at least two optical materials are constructed to provide a waveguide structure. At least one of the materials has a dominant nonlinear characteristic over the length of the waveguide. The index of refraction in this material is a function of the light intensity in the waveguide. By selecting materials that provide either positive or negative Kerr coefficients, and by constructing the device with the nonlinear material either as the core or as the cladding layer, power output versus input characteristics that exhibit both limiting and amplification can be provided.

3. Smith does not teach, show or suggest receiving a light signal with a light receiving unit operative to refract the light signal so that the light signal is substantially prevented from being transmitted through the light receiving unit if an intensity level of the light signal has a predetermined relationship with an intensity threshold level, as recited by claim 1.

The waveguide structure of Smith does not prevent a light signal from being transmitted through the waveguide structure if an intensity level of the light signal has a predetermined relationship with an intensity threshold level, as required by claim 1. At best, the waveguide structure of Smith *attenuates* light at a level that depends on whether

the intensity exceeds a threshold level. Attenuating light, however, is not "preventing" transmission of light. The attenuation taught by Smith still allows light to pass.

In particular, as shown in Figs. 6 and 7, the waveguide structure outputs a light signal with an output power P_{OUT} that is, at a minimum, a constant percentage of the input power P_{IN} of the input light signal. That is, the waveguide structure of Smith allows at least a constant percentage of the input light signal to be transmitted through the waveguide structure, regardless of the intensity of the light signal. The constant percentage is represented by curve 62 in Fig. 6 and by curve 72 in Fig. 7.

Figs. 6 and 7 show that the output power P_{OUT} is affected by whether the input power P_{IN} of the input light signal is above or below a power level P_C. For example, in Fig. 6, The output power P_{OUT} is equal to the input power P_{IN} for values of P_{IN} that are less than P_C. However, in no case is the output power P_{OUT} less than a constant percentage of the input power P_{IN} of the input light signal. More particularly, in no case is the output power P_{OUT} equal to zero when the input power P_{IN} is nonzero.

The Examiner cites col. 2, lines 16-44 of Smith as disclosing the subject matter of claim 1. Applicant points out that this paragraph of Smith describes Figs. 2, 3 and 6 of Smith, which were discussed above. More particularly, col. 2, lines 29-34 of Smith state that for "input light intensities up to the level of the predetermined threshold, the structure operates in a waveguiding mode. For light intensities greater than the predetermined threshold, the structure no longer serves as a waveguide and the input light intensity diffracts into the cladding layer." The "predetermined threshold" corresponds to P_C in Fig. 6. What is meant by "operates in a waveguiding mode" and "serves as a waveguide" is

that substantially all of the input light is transmitted through the waveguide structure and is output from the waveguide structure, as indicated by the curve 61. For light intensities greater than P_C the input light intensity diffracts into the cladding layers 21, 22. However, not all of the input light intensity is lost in the cladding layers 21, 22. Rather, at least a constant percentage of the input light intensity is transmitted through the waveguide structure and is output from the waveguide structure, as indicated by the curve 62.

For all of the foregoing reasons, Smith does not disclose or suggest receiving a light signal with a light receiving unit operative to refract the light signal so that the light signal is substantially *prevented* from being transmitted through the light receiving unit if an intensity level of the light signal has a predetermined relationship with an intensity threshold level, as recited by claim 1.

4. Advantages of the Present Invention

The present invention, as recited by claim 1, includes distinct advantages over Smith. By preventing a light signal from being transmitted through a light receiving unit if an intensity level of the light signal has a predetermined relationship with an intensity threshold level, it is possible to protect a photo-detector from being damaged by high intensity light. The types of detectors that can be protected include image intensifiers, television camera tubes, infrared detectors, and the human eye. Because of its low damage threshold, the human eye is the most difficult to protect (U. S. Patent No. 5,561,541, col. 1, lines 10-15).

In one exemplary embodiment, the light receiving unit 18 has a planar interface 24

between a linear optical material 20 and a nonlinear optical material 22. If there is a mismatch between the indices of refraction of the materials 20, 22, then the light can be refracted at the planar interface 24 such that the light is substantially prevented from being received by the fiber optic line 16, as discussed at page 7, line 15 through page 8, line 4 of the present specification. This embodiment is just one of many possible examples of how the present invention may be put into practice, and is not intended to limit the scope of the claims in any way.

The waveguide structure of Smith would not protect a photo-detector, such as the human eye, from high intensity light. Rather, the waveguide structure of Smith allows, at a minimum, a constant percentage of the input power to be output. Thus, the level of light intensity that may be output as power P_{OUT} by the waveguide structure of Smith does not have a maximum value that cannot be exceeded. That is, it is possible to output any level of light intensity by providing a sufficiently high level of input light intensity. The light receiving unit of the present invention, in contrast, can prevent the transmission of a damaging, high intensity light signal.

Moreover, the light receiving unit 18 can be used as an optical switch. That is, when the light signal is refracted at the planar interface 24 and does not pass through light receiving unit 18, this condition is analogous to "logic 1", i.e. where the optical switch arrangement 12 is "off" and not transmissive (page 9, lines 9-12 of the present specification). When the light signal passes through the light receiving unit 18, this condition is analogous to "logic 0", i.e. where the optical switch arrangement 12 is "on" and fully transmissive (page 9, lines 21-23 of the present specification). The waveguide

structure of Smith, in contrast, cannot function as an optical switch because the waveguide structure is always at least partially transmissive.

For the foregoing reasons, Applicant submits that claim 1, and claims 2-5 and 7 depending therefrom, are in condition for allowance, which is hereby respectfully requested.

B. Claims 2-5 and 7

Claims 2-5 and 7 also stand rejected as allegedly being anticipated by Smith. Claims 2-5 and 7 all depend from and incorporate all of the limitations of claim 1. As a result, it is respectfully submitted that the rejection of claims 2-5 and 7 should be withdrawn for at least the same reasons as those set forth above in connection with claim 1.

C. Claim 8

Claim 8 is directed to an arrangement for controlling the transmission of a light signal, including a first fiber optic line for transmitting the light signal. A light receiving unit is operatively coupled to the first fiber optic line so that the light signal is received by the light receiving unit. The light receiving unit is operative to refract the light signal so that the light signal is substantially prevented from being transmitted through the light receiving unit if an intensity level of the light signal has a predetermined relationship with an intensity threshold level. Thus, claim 8 is directed to subject matter that is similar to the same subject matter of claim 1. For all of the reasons given above with regard to claim

1, Applicant submits that claim 8 is also in condition for allowance, which is hereby respectfully requested.

D. Claims 9-11

Claims 9-11 also stand rejected as allegedly being anticipated by Smith. Claims 9-11 depend from and incorporate all of the limitations of claim 8. As a result, it is respectfully submitted that the rejection of claims 9-11 should be withdrawn for at least the same reasons as those set forth above in connection with claim 8.

III. Claims 6 and 12

The Examiner indicated that claims 6 and 12 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, for which courtesy the Examiner is thanked. Applicant points out that claims 6 and 12 depend from and incorporate all of the limitations of claims 1 and 8, respectively. As a result, it is respectfully submitted that claims 6 and 12 are allowable for at least the same reasons as those set forth above in connection with claims 1 and 8.

IV. Conclusion

For all of the foregoing reasons, it is respectfully submitted the Applicant has made a patentable contribution to the art. Favorable reconsideration and allowance of this application is, therefore, respectfully requested.

Respectfully Submitted,

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